Crisper Apples Sooner

Research yields new technology, changes pretreatment protocol.

Almost immediately after picking, apples begin to lose some of their firmness, color, and flavor.

Early settlers attempted to forestall this deterioration by storing their home-grown apples in cool basements or root cellars. This usually worked for a few months before apples became limp and flavorless.

Scientists have since learned a lot about how to store apples longer and make a better quality fruit available to consumers.

BOB NICHOLS

Horticulturist Stephen Drake checks condition of apples in controlled atmosphere storage. Each oven-sized storage unit can maintain its own individual temperature and mixture of carbon dioxide and oxygen. (K5800-1)

In the early 1950's, they worked out an effective strategy—called controlled atmosphere (CA) storage—that slows the fruit's natural respiration rate and quality decline. It makes fruit firmer, crisper, and more flavorful.

In CA storage, apples are kept for a specified time in cold rooms with lower oxygen and sometimes higher carbon dioxide (CO_2) levels than regular cold storage. The apples are then sold or moved into conventional cold warehouses until they are needed at market—sometimes as late as the following summer.

Apples that don't get the CA treatment must be sold before the end of December.

Since 1964 and until recently, Washington State required apples in CA storage to be held for 90 days at 5 percent oxygen or less. And that oxygen level had to be met within 20 days after the treatment room was sealed.

Now, ARS horticulturist Stephen R. Drake has shown Washington State officials that it's possible to reduce the time needed in CA and still realize a quality advantage over apples held in regular cold storage. Drake is at the agency's Tree Fruit Research Laboratory in Wenatchee, Washington.

With that information, the state reduced the time required for CA treatment of the 1994 Gala and Jonagold crops from 90 to 45 days. These apples can still be certified for market and marked "from CA," generating more income for growers.

According to Drake, technology has advanced over the past 30 years so that now an oxygen level of only 1 percent can be met in a few hours.

He uses state-of-the-art controlled atmosphere chambers to determine the minimum time apples need to be kept in CA facilities to gain quality advantages over regular cold storage.

These chambers are regulated by a computer that maintains oxygen, temperature, and CO_2. They are now yielding information on the maximum level of CO_2 permissible for apple varieties.

For example, current recommendations suggest that Delicious apples be kept in a controlled atmosphere of 1 percent CO_2. But removing CO_2 is costly and time-consuming for most CA facilities.

Scientists are experimenting with much higher levels to determine if apple quality can be maintained at a higher CO_2. Each additional percentage of CO_2 would lower storage costs about 60 cents per box.

Scientists at Wenatchee are also collecting data on apricots, a fruit that is currently not stored in CA and creates a market glut in late summer. The use of CA storage may minimize this marketing problem.—By **Dennis Senft,** ARS.

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